

Separation of modified proteins II (phosphorylations)

Karl Mechtler

IMP/IMBA Research Institutes, Vienna, Austria

Reversible protein phosphorylation plays a major role in regulating many complex biological processes such as cellular growth, division, and signaling. Also, the phosphorylation and the regulation of cell signalisation are taught to have important role in human diseases, primarily for cancer. The high importance of protein phosphorylation makes the proper identification of phosphorylation sites an important task. Compared to other proteins in biological system, phosphorylated peptides are present only in low abundance and this presents a problem for their detection and identification. This session will review the main approaches for different enrichment methods (TiO₂, IMAC) as well as mass spectrometry techniques (CAD, IRMP, ECD). Further some selected examples of phospho analysis from protein complexes and total yeast cell lysate will be shown.

1. Mazanek, M., Mitulovic, G., Herzog, F., Stingl, C., Hutchins, J., Peters, JM., Mechtler, K. (2006). Titanium dioxide as a chemo-affinity solid phase in offline phosphopeptide chromatography prior to HPLC-MS/MS analysis; *Nature Protocols*, 2006
2. Mitulovic G., Mechtler K. (2006). Chromatographic techniques in proteomics analysis; *Briefings in Functional Genomics* 2006
3. Stingl Ch, Ihling C ; Sinz A ; Ammerer G ; Mechtler K; Application of Different Fragmentation Techniques for the Analysis of Phosphopeptides using a Hybrid Linear Ion Trap - FTICR Mass Spectrometer Article Type: Special Issue: Posttrans. Mod. Proteomics BBA 2006
4. Riedel CG, Katis VL, Katou Y, Mori S, Itoh T, Helmhart W, Galova M, Petronczki M, Gregan J, Cetin B, Mudrak I, Ogris E, Mechtler K, Pelletier L, Buchholz F, Shirahige K, Nasmyth K. (2006). Protein phosphatase 2A protects centromeric sister chromatid cohesion during meiosis I. *Nature*. 2006
5. Petronczki M, Matos J, Mori S, Gregan J, Bogdanova A, Schwickart M, Mechtler K, Shirahige K, Zachariae W, Nasmyth K. Monopolar attachment of sister kinetochores at meiosis I requires casein kinase 1. *Cell*. 2006